PATENT COOPERATION TREATY

From the
INTERNATIONAL SEARCHING AUTHORITY

To:
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PCT

WRITTEN OPINION OF THE INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43*bis*.1)

Date of mailing (*day/month/year*)	13 NOV 2006
Applicant's or agent's file reference	FOR FURTHER ACTION See paragraph 2 below
LBNL.001VPC	

International application No.	International filing date (*day/month/year*)	Priority date (*day/month/year*)
PCT/US04/40872	06 December 2004 (06.12.2004)	04 December 2003 (04.12.2003)

International Patent Classification (IPC) or both national classification and IPC
IPC: C09K 3/00(2006.01) C12Q 1/68(2006.01);G01N 33/53(2006.01)
USPC: 516/135;435/6,7.1

Applicant
REGENTS OF THE UNIVERSITY OF CALIFORNIA

1. This opinion contains indications relating to the following items:

- ☒ Box No. I Basis of the opinion
- ☐ Box No. II Priority
- ☐ Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- ☐ Box No. IV Lack of unity of invention
- ☒ Box No. V Reasoned statement under Rule 43*bis*.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- ☐ Box No. VI Certain documents cited
- ☒ Box No. VII Certain defects in the international application
- ☐ Box No. VIII Certain observations on the international application

2. FURTHER ACTION

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1*bis*(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

3. For further details, see notes to Form PCT/ISA/220.

Name and mailing address of the ISA/US	Date of completion of this opinion	Authorized officer
Mail Stop PCT, Attn: ISA/US Commissioner for Patents P.O. Box 1450 Alexandria, Virginia 22313-1450 Facsimile No. (571) 273-3201	01 October 2006 (01.10.2006)	Valerie Bell-Harris M. Franco Salvoza Telephone No. (571) 272-1640

Form PCT/ISA/237 (cover sheet) (April 2005)

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International application No.
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Box No. I Basis of this opinion

1. With regard to the language, this opinion has been established on the basis of:

☒ the international application in the language in which it was filed

☐ a translation of the international application into _____, which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b)).

2. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application and necessary to the claimed invention, this opinion has been established on the basis of:

a. type of material

☐ a sequence listing

☐ table(s) related to the sequence listing

b. format of material

☐ on paper

☐ in electronic form

c. time of filing/furnishing

☐ contained in the international application as filed.

☐ filed together with the international application in electronic form.

☐ furnished subsequently to this Authority for the purposes of search.

3. ☐ In addition, in the case that more than one version or copy of a sequence listing and/or table(s) relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

4. Additional comments:

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Box No. V Reasoned statement under Rule 43 *bis*.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims Please See Continuation Sheet	YES
	Claims Please See Continuation Sheet	NO
Inventive step (IS)	Claims Please See Continuation Sheet	YES
	Claims Please See Continuation Sheet	NO
Industrial applicability (IA)	Claims Please See Continuation Sheet	YES
	Claims Please See Continuation Sheet	NO

2. Citations and explanations:

Please See Continuation Sheet

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Box No. VII Certain defects in the international application

The following defects in the form or contents of the international application have been noted:

Claim 30 is objected to under PCT Rule 66.2(a)(iii) as containing the following defect(s) in the form or contents thereof: It contains a misspelling of the term "florescence."

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Supplemental Box
In case the space in any of the preceding boxes is not sufficient.

V.1. Reasoned Statements:
The opinion as to Novelty was positive (Yes)with respect to claims 2-6, 9, 12, 15-17, 19-24, 29, 31
The opinion as to Novelty was negative (No) with respect to claims 1, 7, 8, 10, 11, 13, 14, 18, 25, 26, 27, 28, 30, 32
The opinion as to Inventive Step was positive (Yes)with respect to claims NONE
The opinion as to Inventive Step was negative(NO) with respect to claims 1, 7, 8, 10, 11, 13, 14, 18, 25, 26, 27, 28, 30, 32
The opinion as to Industrial Applicability was positive (YES) with respect to claims 1-32
The opinion as to Industrial Applicability was negative(NO) with respect to claims NONE

V. 2. Citations and Explanations:
Claims 1, 7, 8, 10, 11, 18, 25, 28, 30, 32 novelty under PCT Article 33(2) as being anticipated by TANG et al. (2001).

Claim 1 recites a method for detecting an analyte in a sample, comprising: providing a suspension of colloidal particles, wherein said particles are associated with a ligand that binds to said analyte, and wherein said colloidal particles are near a dynamical phase transition state; contacting said suspension with said sample; and determining whether said colloidal particles transition from a first phase to a second phase, wherein such transition is indicative of said analyte being present in said sample.

Claims 7, 8, 10, 11 further recite the method of claim 1 wherein said ligand is non-covalently linked to said colloidal particles; wherein said ligand is interspersed within a lipid layer on said colloidal particles; wherein said analyte is selected from the group consisting of a protein, a nucleic acid, an antibody, an antigen, a receptor, a virus, and a bacteria; wherein determining whether said colloidal particles transition from a first phase to a second phase comprises measuring the distances between centers of said colloidal particles in said suspension.

Claims 13, 14 recite the method of claim 1, wherein said first phase is a condensed phase and said second phase is a dispersed phase; wherein said first phase is a dispersed phase and said second phase is a condensed phase.

Claim 18 recites an assay system for detecting the binding, comprising: a suspension of colloidal particles, wherein said particles are near a dynamical phase transition state; a ligand associated with said particles and specific for said analyte; and a device configured to determine if said colloidal particles transition from a first phase to a second phase when contacted by said analyte, wherein such transition is indicative of said analyte being present in said sample.

Claim 25 further recites the system of claim 18 wherein said ligand is non-covalently linked to said colloidal particles.

Claims 13, 14 recite the system of claim 18, wherein said first phase is a condensed phase and said second phase is a dispersed phase; wherein said first phase is a dispersed phase and said second phase is a condensed phase.

Claim 28 recites an assay system as recited above further comprising a means for detecting is said colloidal particles transition from a first phase to a second phase when contacted by said analyte, wherein such transition is indicative of said analyte being bound to said ligand.

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Supplemental Box
In case the space in any of the preceding boxes is not sufficient.

Claims 30, 32 further recite the system of claim 28 wherein said means comprises a florescence detector; wherein said ligand is non-covalently linked to said colloidal particles.

TANG et al. teaches providing a suspension of DNA-linked colloidal nanoparticles above the phase transition temperature of the polyNIPAAm part (p. 165). A complementary ODN was added to the dispersion, wherein the particles dispersed in the absence of the complementary ODN, and aggregated in the presence of the complementary DNA. The analyte is a nucleic acid as recited in claim 10; the distances between the colloidal particles was measured as they were measured in a dispersed phase as opposed to an aggregated one. Further, a decrease in transmittance was measured in the conjugate solution containing the complementary ODN. Thus, TANG et al. teaches a method and device determining that the DNA-linked colloidal nanoparticles aggregate depending on the DNA hybridization (p. 166).